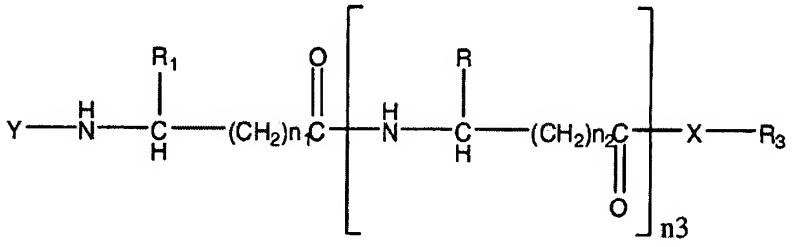
Amendments to the Claims

1-59 (Canceled)

60. (New) A water-soluble thioester or selenoester compound of the formula:



wherein Y is selected from the group consisting of: an amino acid, a peptide, and a polypeptide;

X is sulfur or selenium;

n_1 and n_2 are each from 0 to 2, and n_3 is from 0 to 100;

R and R_1 are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

R_3 is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of: -[C(O)-φ-C(O)-NH-ψ-NH]n_5 and –[NH-ψ-NH-C(O)-φ-C(O)]n_5, where n_5 is an integer from 2 to 100, and φ and ψ are divalent radicals that may be the same or different and are selected from the group consisting of -((CH_2)n_6-(CH_2CH_2O)n_7-(CH_2)n_6-)- and –((CH_2)n_6-(O-CH_2-CH_2)n_7-(CH_2)n_6-)-, where n_6 is an integer from 1 to 6 and n_7 is an integer from 2-50.

61. (New) The thioester or selenoester compound according to claim 60 wherein Y is a peptide or polypeptide.

62. (New) The thioester or selenoester compound according to claim 61 wherein said peptide or polypeptide comprises protected amino acids.

63. (New) The thioester or selenoester compound according to claim 61 wherein said Y contains an N-terminal amino acid containing a group that supports chemical ligation.

64. (New) The thioester or selenoester compound according to claim 60 wherein

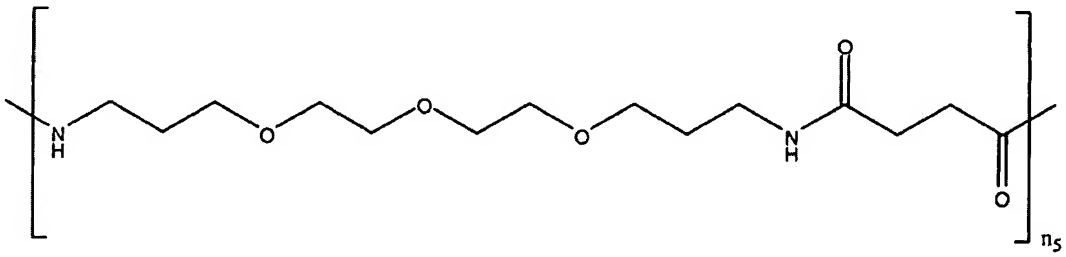
R_3 comprises a group of the formula $-C(R_7)(R_8)$-U-Polymer, where

R_7 and R_8 are each individually selected from the group consisting of: hydrogen or linear, branched, substituted, or unsubstituted alkyl, aryl, heteroaryl, and benzyl, and

U is selected from the group consisting of alkyl, aryl, heteroalkyl, heteroaryl, alkoxy, of up to 18 carbon atoms, and

Polymer is selected from the group consisting of: $-[C(O)-\varphi-C(O)-NH-\psi-NH]n_5$ and $-[NH-\psi-NH-C(O)-\varphi-C(O)]n_5$, where n_5 is an integer from 1 to 100, and φ and ψ are divalent radicals selected from the group consisting of $-((CH_2)n_6-(CH_2CH_2O)n_7-(CH_2)n_6-)-$ and $-((CH_2)n_6-(O-CH_2-CH_2)n_7-(CH_2)n_6-)-$, where n_6 is an integer from 1 to 6 and n_7 is an integer from 2-50.

65. (New) The thioester or selenoester compound of claim 64 wherein Polymer comprises a divalent radical of having the structure:



where n_5 is an integer of from 2 to 12.

66. (New) The thioester or selenoester compound of claim 64 wherein

φ is $-(CH_2-CH_2)-$ and ψ is $-(CH_2-(CH_2-CH_2-O)_3-CH_2-CH_2-CH_2)-$ or $-(CH_2-CH_2-CH_2-(O-CH_2-CH_2)_3-CH_2)-$.

67. (New) The thioester or selenoester compound of claim 60 wherein R is a group of the structure $-C(R_4)(R_5)(R_6)$,

where R_4, R_5, and R_6 each individually are selected from the group consisting of: hydrogen, linear, branched, substituted or unsubstituted alkyl, aryl, heteroaryl, and benzyl.

68. (New) The thioester or selenoester compound of claim 64 wherein

Y is a peptide or polypeptide;

X is sulfur;

n_1 and n_2 are 0;

R_7 and R_8 are each individually selected from the group consisting of: hydrogen, $-CH_3$, and $-CH(CH_3)_2$.

69. (New) The thioester or selenoester compound of claim 68 wherein:

n_5 is from 2 to 50, n_6 is from 1 to 3, n_7 is from 2 to 5; and

φ is $-(CH_2-CH_2)-$ and ψ is $-(CH_2-(CH_2-CH_2-O)_3-CH_2-CH_2-CH_2)-$ or $-(CH_2-CH_2-CH_2-(O-CH_2-CH)_3-CH_2)-$.

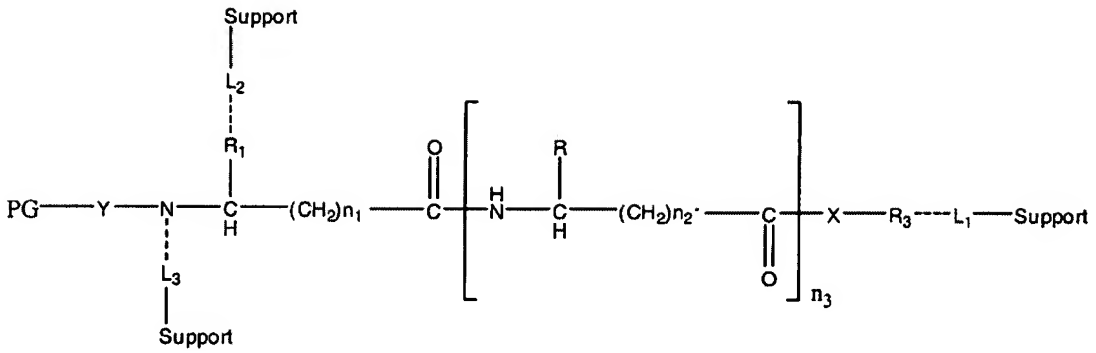
70. (New) The thioester or selenoester compound of claim 60 wherein Y comprises an N-terminal group that supports chemical ligation.

71. (New) The thioester or selenoester compound of claim 70 wherein the N-terminal group comprises cysteine or selenocysteine.

72. (New) The thioester or selenoester compound of claim 71 wherein the cysteine or selenocysteine is protected.

73. (New) A method of cleaving a thioester or selenoester compound from a solid support, said method comprising:

providing a thioester or selenoester generator having the formula:



wherein PG is a protecting group that may be present or absent,

Y is an amino acid, a peptide, or a polypeptide and may be present or absent, and when Y is absent PG is an amino protecting group that may be present or absent;

R and R_1 are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

R_3 is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of: -[C(O)-φ-C(O)-NH-ψ-NH]n_5 and –[NH-ψ-NH-C(O)-φ-C(O)]n_5, where n_5 is an integer from 2 to 100, and φ and ψ are divalent radicals that may be the same or different and are selected from the group consisting of -$((CH_2)n_6$-$(CH_2CH_2O)n_7$-$(CH_2)n_6$-)- and –$((CH_2)n_6$-$(O\text{-}CH_2\text{-}CH_2)n_7$-$(CH_2)n_6$-)-, where n_6 is an integer from 1 to 6 and n_7 is an integer from 2-50.

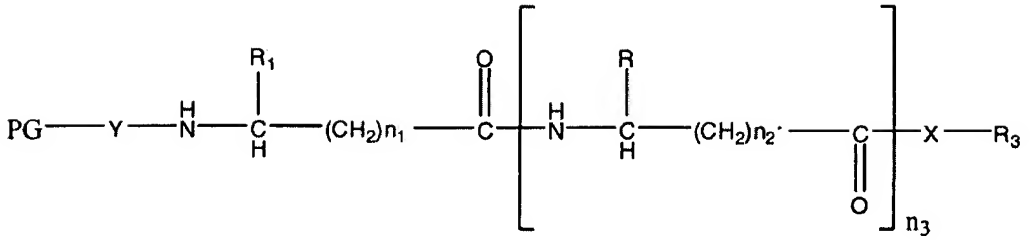
X is sulfur or selenium;

n_1 and n_2 each are from 0 to 2; n_3 is from 0 to 100;

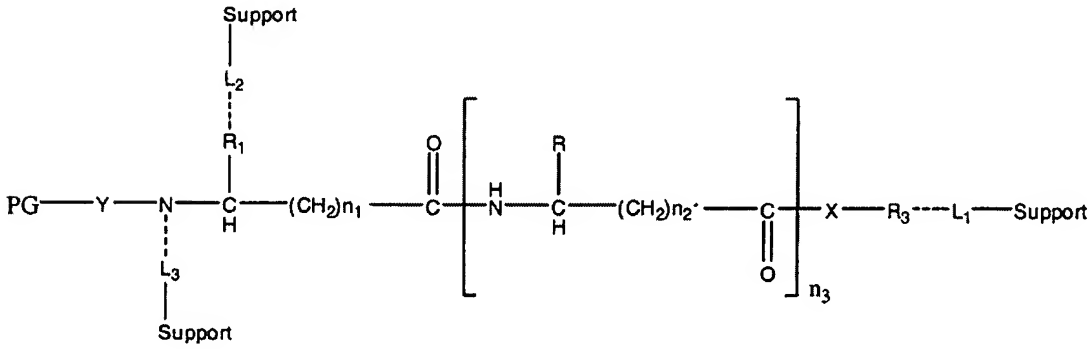
each L_1, L_2 and L_3 is a linker cleavable under non-nucleophilic conditions wherein only one of L_1, L_2, and L_3 is present;

Support is a solid phase, matrix or surface; and

(b) cleaving said linker under non-nucleophilic conditions to generate a thioester or selenoester compound comprising the formula:



74. (New) A thioester or selenoester generator comprising a composition having the formula:



wherein PG is a protecting group that may be present or absent,

Y is an amino acid, a peptide, or a polypeptide and may be present or absent, and when Y is absent PG is an amino protecting group that may be present or absent;

R and R_1 are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

R_3 is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of: -[C(O)-φ-C(O)-NH-ψ-NH]n_5 and –[NH-ψ-NH-C(O)-φ-C(O)]n_5, where n_5 is an integer from 2 to 100, and φ and ψ are divalent radicals that may be the same or different and are selected from the group consisting of -

$((CH_2)n_6\text{-}(CH_2CH_2O)n_7\text{-}(CH_2)n_6\text{-})$- and $-((CH_2)n_6\text{-}(O\text{-}CH_2\text{-}CH_2)n_7\text{-}(CH_2)n_6\text{-})$-, where n_6 is an integer from 1 to 6 and n_7 is an integer from 2-50.

X is sulfur or selenium;

n_1 and n_2 each are from 0 to 2; n_3 is from 0 to 100;

each L_1, L_2 and L_3 is a linker cleavable under non-nucleophilic conditions wherein only one of L_1, L_2, and L_3 is present;

Support is a solid phase, matrix or surface.